OPHTHALMIC DIAGNOSTIC AND OPERATING CLINICS IN RURAL ASIA

by

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With Foreword by

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For those who do not know the conditions well it is impossible to appreciate the ophthalmic problems in the vast rural areas of a country such as India, where over two per cent of a population of hundreds of millions are blind, largely because of cataract. It is to be remembered that ophthalmic surgeons are relatively few and largely concentrated in the cities and that it is impossible for the peasant to travel to these. The result is that hundreds of thousands of people in the prime of their late adult life remain blind, unable to earn their livelihood and a burden on their relations, and die in two or three years from starvation from lack of the desire to live or to eat.

The only remedy for this distressing state of affairs is to bring eye camps to these inaccessible areas where surgical facilities are woefully deficient or absent. Many such exist in India today, several sponsored by the Royal Commonwealth Society for the Blind; but many more are required. The running of such a camp presents many problems to those who have practised only in more sophisticated surroundings, problems entirely unsuspected until the practical task is actually undertaken. To meet these difficulties no better guide could be imagined than this fascinating book by Dr Ronald Holland, a surgeon who has had long and immense experience in this type of work, following since his youth in the wake of his illustrious and much loved father, Sir Henry Holland, who initiated this admirable idea. Every aspect is discussed in great detail:- the conduct of a preliminary diagnostic clinic, the requirements of a surgical clinic, the pre-operative care, the maintenance of sterility, the best techniques for rapid surgery so that the surgeon and his team, using three or four tables in the theatre and operating on patients already prepared and anaesthetized and with regional akinesia, can deal with a hundred or more patients a day, each surgical procedure in the absence of complications lasting less than two minutes, and finally, the after-care and the treatment of post-operative complications. All the advice is eminently sound, extremely practical and the result of long experience; and the visual end-results are very satisfactory indeed.

This book is of great value not only as it applies to conditions in Asia but also in many other similar regions elsewhere. Apart from the immense interest in reading it, it will be most useful to those already doing this type of work and indispensable for those who have had no or little experience of it and wish to undertake one of the most exacting but rewarding tasks available to the ophthalmic surgeon.

OPHTHALMIC DIAGNOSTIC AND OPERATING CLINICS IN RURAL ASIA

Chapter 1

AIMS

These are to bring ophthalmic services, both diagnostic and therapeutic, to patients living in rural areas, who would otherwise not journey to the larger towns or centres.

As carried out at present, they must be understood as temporary measures to fulfil a tremendous need until such time as these rural areas in the Indian subcontinent are supplied with efficient rural health centres, fully equipped for the operative treatment of eye diseases. These should be situated where the average poor villager can have easy access, and close enough to his home so that the economic and family pressures are not too heavy to prevent his going. Obviously the construction of all weather roads in rural areas, and the provision of government or private transport services will do much to help, but even when these centres are established, there will be a need for the medical services of the country to provide a specialist team of ophthalmologists with trained nursing and paramedical personnel to hold diagnostic and operating clinics in them. At present these clinics, which are commonly known as 'Eye Camps' are held in public or private buildings in these rural areas, which are lent or hired for the purpose, and which often require to be adapted, sometimes at considerable expense.

Dr G. Venkataswamy, Professor of Ophthalmology of the Madurai Medical College in South India, has pointed out some facts which outline the nature of the problem and the desperate need for these eye camps throughout the Indian subcontinent, which will be true at any rate for the next two generations. He shows that about 2% of the rural population are wholly or partially blind and unable to earn their livelihood. Of these about 75% are suffering from blindness which is curable, and a major proportion of this is from senile cataract. For a long time to come the existing facilities will not be able to provide the needed relief in the rural areas. Tamil Nadu State, for example, with a population of 40 millions, has only 200 eye surgeons, which are mostly concentrated in the big cities, whereas 80% of the population live in rural areas. In Ramnad district, with a population of 3 millions, there are only three trained ophthalmic surgeons. In this district it is estimated that ten to fifteen thousand people are blinded with cataract annually, and the existing facilities can cope with little more than 10 to 20% each year, leaving the majority to be a burden to their relatives, and eventually to die from starvation from the lack of desire to live and even to eat. It is estimated that the average life of an aged blind person may be only two or three years after becoming blind. Such unfortunate persons, who should be in the prime of their old age, fulfilling the tasks of village counsellors, advisors, organisers and the like, come to be gradually disregarded and cast on one side as useless burdens to the community.

These tragic circumstances are not appreciated by the Western mind and members of social welfare states, but nevertheless constitute a challenge and a problem for the ophthalmologists in developing countries and in more technically advanced countries, whose surgeons can often give a regular period of practical help.

CHOICE OF SITE FOR A CLINIC OR EYE CAMP

It seems axiomatic to point out that the clinic should be held in a place where the ophthalmic services are non existent or scarce or inadequate. But too often, due to professional jealousy or greed, there is a tendency to hold them in close proximity to a long established centre of eye work. This is quite unjustified, and should be strongly condemned. There is far too much to be done in the rural areas to warrant any duplication in places which are inadequately served by other clinics.

Sometimes the choice of a situation is governed by the fact that the buildings available there are good and there are good facilities for publicity. But this may be the least needy area to choose. And what should NOT govern the decision is whether the site is in a pleasant area, easily accessible for the medical staff, and where there are adequate facilities for electricity, lighting, running water, etc. Many very successful clinics have been held in inaccessible places where there are virtually no facilities or amenities, and these are certain to be much more worthwhile and valuable for the local population. The task of the medical administration is to transport both personnel and facilities needed for the eye camp to the places where they are non existent and sorely needed.

TWO TYPES OF EYE CAMP

1. The Diagnostic Clinic

This may consist of an ophthalmologist plus one or two trained nurses or assistants, as a team. It may be held at a recognised medical centre in the rural areas, or even in a private house or tent. In fact any ordinary room of sufficient size will do, provided it lends itself to being darkened, and is near a place where the patients and their relatives can congregate while waiting their turn to be seen. The advantages of this type of clinic are:- a. It requires less personnel, less instruments and other equipment. b. It may last only one or two days, up to a week. c. It enables the patient to come to consult with a specialist team near his own home. He can then discover whether his malady is trifling or seriously demanding medical attention, and whether it can be treated as an out-patient or not. He can be told whether his cataract is ripe for operation, whether he has glaucoma or not, and how soon he needs treatment. He can be told that delay may cause incurable blindness in the case of glaucoma, or that he can come for treatment when he has had plenty of time to make arrangements. In all these situations the patient may be able to save his sight, or a long and tedious and expensive journey to a city clinic, where he may be told to return in six months or a year, and thus possibly save what is to him a fair sum of money. d. And what is most important, the patient and his relatives can meet with the doctor and the nurses personally on their own ground. They can watch how the other patients are treated and gain confidence and courage to show their timid and unforthcoming relatives to them. The personal advice and information given to them, though it may sound commonplace to an educated person, often needs to be repeated and re-emphasised personally several times over before the facts have really been grasped and believed by the villager.

Here we might digress a little to labour the point that the doctor and his team must be simple, humble, honest and tactful in everything. When explaining matters of importance to the patients or relatives, the doctor has to remember that in many areas half truths or even falsehood are so common among quacks and even local medical personnel that a great many people have learnt to distrust medical personnel. They interpret advice for operation as meaning that the doctor is really anxious to practise his skill on their eyes, whether they may need it or not, and may be attempting to extract a fee from them. In fact the patient may have a built-in distrust complex which may lead to his blindness unless the doctor can remove that by his personal contact and behaviour.

2. The Operating Clinic or Operating Eye Camp

This is a much more elaborate and larger affair, involving planning, publicity, and preparation with much attention to detail, in order to achieve success.

a) Selection of Site. (See previous discussion) Correspondence and personal interviews with local land or property owners, city or district counsellors, administrative officers etc. It must be decided whether the clinic is to be held in hired or borrowed buildings, and how much alteration, modification and repair needs to be done. There arises the question of clean water supply, the fitting of electric plugs and other connections, wire gauze and glass in windows etc.

b) The rooms needed are:- 1) Waiting room or courtyard with rush matting or canvas marquee shelters from the sun. 2) Consulting room with tables, chairs, benches, and arrangements for correct note taking of the patients' condition and operations, results, etc. 3) A preparation room or verandah where the patients can be given their preoperative treatment and injections. 4) An operating room. 5) A room for sterilising instruments etc. 6) A treatment room for doing dressings for outpatients and after operation for ambulant patients. 7) An optional dressing room for treating patients with sepsis of various kinds. 8) A pharmacy next to the treatment room. These rooms must all have simple and strong furniture and equipment for the comfort and easy running of the clinic both from the point of view of the staff and the patients.

Chapter 2

The Operating Clinic or Operating Eye Camp

The Sterilising Room

This is very advantageous for a camp dealing with more than 100 or so cataract operations, or lasting more than a few days. It should be situated next to the operating room, and have room for one or two autoclaves in which the operating towels, dressings, swabs, sutures etc. and the gowns, caps and masks are sterilised.

In a smaller camp these can all be autoclaved at the base hospital and packed separately into small containers sufficient for ten or twenty operations each.

The sterilisation of Instruments. These are sterilised by boiling in all but the very sophisticated camps. In smaller camps autoclaving is impossible, since this depends on possessing a large number of high speed autoclaves, and these in turn depend on a current which is dependable and with a voltage which is stable, not always possible in many areas. It must be remembered that the presence of an electric supply does not always carry with it the assurance of adequate voltage or a continuous supply of current. If these are not present, all the sophisticated apparatus immediately loses its value. Therefore, in smaller and remote clinics recourse has to be made to the use of oil fuel sterilisers of a simple type. These may look crude, but can be very effective.

The sterilising room must also be fly proof, and have a number of tables, shelves, benches etc to facilitate the general working of the room.

The Operating Room

The size of this will depend on what is available, and also on the size of the clinic and the number of surgeons to accomplish the work properly.

Normally at least two tables must be ready for each surgeon. This number may be increased to three or four if adequate and efficient trained assistant staff are available and if the surgeon is a quick operator. The tables may be made locally or else carried about with the other camp equipment. The best I have seen were designed and made by Dr S. Adhvaryoo in Gujerat State. These were stable, secure, folding, and comparatively light to transport. They were designed for operating while sitting on a stool. The ones for operating in a standing position are more bulky and heavier.

The other furniture required is tables or wide shelves on which to place the instruments and other sterile articles, dishes, bowls etc. Tables for anaesthetic equipment, for gowns, caps and masks, gloves, dressings, bandages, etc. Spot lights or battery flashlights must also have stands or be placed somewhere.

The treatment rooms also need benches, tables, shelves etc, and should not be forgotten when making arrangements for collecting furniture for the camp.

The Pre-Operative Treatment and the Preparation for Eye Camps

1. It is the practice of many camps to send an advance team of technicians and doctors and nurses two or three days ahead of the operating team. This team arrives solely for the purpose of assessing the patients, admitting them, and beginning the pre-operative treatment and care. It must be remembered that the base hospital must have a large staff in order to do this.

The advantages of this procedure to the medical staff of the hospital are many:- a) When the actual operating begins, the pressure of work is less. All the staff can then be used for speeding up the various things that have to be done to help the surgeons avoid delay in between operations, and thus make the running of the operating sessions more efficient. b) The operating surgeons do not have to spend time waiting while the admissions are in progress. They can come to the camp for two to three days and then return to their university teaching and private practice, leaving a junior medical ophthalmologist to cope with the immediate after care, and prepare the patients for the final visit of the operating surgeons seven to ten days later.

The advantages *to the patients* of this arrangement are not apparent, and contrariwise, there are a number of disadvantages:- a) All have to come within one or two specified dates, which may be difficult or impossible for them, if they live at a distance, and cannot time their arrival accurately. b) They have to wait two or three days until their operation is done. Economic and domiciliary difficulties arise on account of this. In their absence at hospital, the cow may be calving, the irrigation water may be coming, or their relations may be ill and need attention — all during those two or three vital days. Arrangements for the journey and for many other matters such as care of children, if they do not bring them, and care of their livestock and house as well, which may not be easy unless an arrival date for admission can be

more elastic. c) News may not have filtered through to their village, or the dates may have been wrongly transmitted by the time the news has reached some outlying villages. Any of these or combinations of them may result in the patients simply not appearing at all for treatment, when they certainly should do so.

2. Other camps such as in Coimbatore in South India and Mirpurkhas in Pakistan are semi-permanent, and overcome many of these difficulties. These camps have great advantages, but they are to a certain extent offset by the fact that their location must necessarily be inconvenient for a large number of patients who live far away.

3. The third type which meets the demands of close location to the patients' homes, and also gives the patients a range of one to five or six weeks in which they can make the journey to the hospital, is the arrangement by which the whole surgical team of doctors, nurses and assistants goes out for a period of a week to six weeks or more to the site at which the camp is held. Thus, the patients know that

a) they may arrive on any day during the time advertised, and

b) that their pre-operative treatment will be a matter of a few hours or a day (unless their eyes are slightly infected), and that the consequent delay between arrival and operation will be as short as possible.

In these camps the patients are screened and admitted on the day of their arrival, and indeed most of those admitted before mid-day are operated on before evening. This arrangement leaves the patients and their relations little time to sit about in a strange place and worry over their impending operation. The job is completed almost before they have time to do any worrying.

But this method of running a camp presents certain difficulties and disadvantages for the surgeon and staff. They have to spend a longer time away from their place of work, but this can be obviated in a university or large hospital by each consultant doing a few days' duty at a time, then handing over to another, who in turn may be replaced by a third.

The advantage of this arrangement for surgeons and staff is the 'staggering' or even distribution of operations over a period of some days. It eliminates the severe rush and strain of having to attempt to finish a huge list of operations in the target of a very few days — with its consequent long hours, fatigue, and the difficult sanitary problems which inevitably arise when several thousand patients with their relatives are all crowded together in one place.

In addition to all this, the long hours and fatigue involved in a rush camp of a very few days do not lend themselves to greater efficiency of surgical, anaesthetic, or nursing procedures and techniques. We have often noted that the complication rates after cataract operations tend to increase in those patients operated on in stress periods. Human errors creep in, resulting in an increase of sepsis, haemorrhage, and lack of attention to detail even in the after treatment. Men are not machines, nor even are women, however willing and eager they may be to see good results. The very fact of having to complete a certain number of operations in a limited time puts undue pressure on the whole staff, and so standards are lowered, though the willing staff themselves may not be aware of it.

The Technique of Operation, Pre-operative Treatment, and Post-Operative Care

The Danger of a Complacent Attitude

It is only too easy to establish a routine for the pre- and post-operative treatment of patients, and to keep to it without much alteration over the passage of years. We all tend, somehow, to be fearful of altering a technique, even by a little, which appears to have stood the test of time. Yet happily, there is among most surgeons the desire always to improve on efficiency, to lessen the complications, and thereby give the patient a better visual result.

Yet few men have the opportunity of extensive travel and study of various kinds of eye camps, held in many varying circumstances, which can be assessed and compared. It is only when such an objective comparison is made that we can discern what are the main unchangeable pillars on which all the other techniques are supported. We can try to assess what are the advantages of certain procedures and what are the advantages of others which are added to these. We can also discern what, in fact, seems to be unnecessary, though other clinics have adopted this very procedure for years.

How is it possible to evaluate techniques, so that we can discern the sheep from the goats, the essentials from the 'frills', the things we should do that we have not done, and, conversely, the things we can or should leave undone, although we have always been doing them? What are our criteria? How do we evaluate these procedures?

They must obviously be assessed in the context of the eye camp situations where, indeed, the task has to be carried out, for the reasons previously outlined. They may be summarised in that there exists a huge multitude of blind patients, whose cataracts and glaucomas or other diseases are not treated because they cannot get to hospital or because of other reasons. And even if they were all to present themselves for treatment, the eye hospitals of the country would be swamped and totally unable to cope with the demand. So, as an interim arrangement, we are compelled to have operating clinics near the patients and in buildings and in surroundings not designed as hospitals at all.

This means that the conditions for operating cannot be ideal, and yet we must accept that fact, when it means either that the patient will probably die blind while we are waiting for the myth of ideal operating conditions, or even of good conditions, or else we must fashion an efficient, if somewhat crude method of restoring his sight. And this method should approximate to that standard of vision which would be obtained if he came for treatment to an established eye hospital for operation. But we must never be content with anything shoddy or second rate. That is not our aim.

Nevertheless it is surprising what excellent results can be obtained by the methods of operative technique adopted in successful eye camps even with basic minimal equipment and surroundings. The quality of work which can be done is certainly not believed unless it is seen. The few reported articles in the Western press on the standard of work in eye camps in the Indian subcontinent indicated that the observer has been both surprised and impressed by the general excellence of the work and the high percentage of successful results (96% — 98%) over a very large number of cataract extractions. I have repeatedly seen 6/3 vision in patients operated on by the standard methods used in these operating clinics.

The next aspect of eye camp surgery that stands out as imperative for consideration is the fact that speed in operating is one of the things that are requisite and necessary both for the staff and the patients. Slow methods of operation merely defeat the object of the whole project, which is to give sight to many thousands of people and give it them soon, or not at all.

Accordingly there is no place for the surgeon in an eye camp who wants to demonstrate his skill in carrying out long procedures involving multudinous sutures and manipulations. The whole object of the eye camp is to restore sight to as many people as possible with the minimum disturbance to them and to the staff. Academic niceties in technique, which have been introduced in their hundreds are mostly irrelevant in eye camp surgery, and can often seem even amusing when one sees the many thousands of patients with excellent vision, subsequently taking up jobs such as tailoring, embroidery, accounting and the like, which demand a reasonable or high degree of visual acuity, and remembers that they have been operated on with sound but simple and quick techniques. These techniques have been developed with experience and involve a minimum of fuss and a high degree of skill and dexterity on the part of the surgeon and nursing assistants alike. It is not always necessary to take two bites to a cherry.

Let it be clearly understood, however, that I am not decrying the excellent techniques for cataract extraction employed in hospitals all over the world, but merely wondering whether it is not true that comparable visual results are not obtained with much simpler methods than is ordinarily assumed. Kipling has said, 'There are nine and sixty ways of constructing tribal lays, and every single one of them is right'. Is it not indeed possible that the hard lessons we have had to learn in years of eye camp surgery and the skills acquired might sometimes even be applied in some sophisticated hospitals with advantage?

Chapter 3

The Necessity and Relative Importance of Pre-operative Procedures in Eye Camps

Urine Testing

This reveals the occasional diabetic and nephritic patient. They should always be done in younger patients with cataract, but as a routine procedure for all patients in eye camps, one has to ask the question as to how much the tests contribute to the efficiency of the final result. The tests can more easily be omitted when time is limited.

Blood Pressure Estimation

It is doubtful if this really has any bearing on the final result. Hyperpiesia does not affect the percentage of haemorrhages in the anterior chamber or from the choroidal vessels. Again, this test does not seem to be essential.

Test Bandaging

Many surgeons do this as a routine. We used to do it in our clinics in Quetta and Shikarpur for some years, but abandoned it, since it soon became clear that if any eye was clinically infected it would be discovered either in the Out Patient department, or after the application of amethocaine drops outside the operating theatre. When anethaine is instilled into the conjunctival sac, any latent infection soon shows itself by an increased lacrimation and redness, in spite of vasoconstrictor drops. Patients with such infections are returned for treatment for a few days before operation is undertaken.

Evacuation of the Lacrimal Sac

This can be done either by syringing or by pressure. If there is obstruction, then cataract or other intraocular operation should be deferred until some simple procedure such as a Summerskill's D.C.R. or else an excision is completed. But I have seen several noteworthy instances when a chronically infected sac was missed in the O.P.D. and the cataract removed without any resulting intraocular infection, though the conjunctival fornices were full of purulent discharge on the first dressing. And conversely, I have not yet seen an instance of intraocular infection after a cataract extraction where the sac was subsequently found to be infected.

Measurement of Intraocular Tension

This is surely a mandatory procedure, but it is surprising how many clinics omit it. The measurement should be done on admission and recorded on the patient's chart. Failing this, the surgeon may miss many early cases of glaucoma or sustain vitreous loss at operation. Surely no patient is properly prepared for a cataract extraction unless he has had this simple procedure completed. Those who give diamox before operation routinely should be sure that the tension is recorded before this is administered. It is probable that pre-operative administration of diamox is not necessary in the majority of patients.

Cutting of Eye Lashes

This is widely practised, and yet some clinics, notably the Sitapur group, have abandoned it. The advantages of leaving them in situ are that there is no irritation later on when the lashes begin to grow, and therefore less likelihood of the patient rubbing his eyes in consequence. Lashes cannot be completely sterilised because the lash follicles harbour the staphylococci or other organisms which are often present. But it seems probable that the parts of the lashes which protrude from the follicles can be temporarily sterilised, for I have repeatedly observed in one clinic the surgeons making incisions with the von Graefe knife, the blade of which brushed against the lashes before the knife entered the anterior chamber — and without any resulting infection. This took place in a series I observed of more than 400 incisions.

On the other hand, most surgeons believe that the lashes are a mechanical hindrance, and tend to get in the way of the operator. Small sharp scissors, well smeared with vaseline to catch the hairs as they fall, is the best way of removing the lashes.

Washing the Face

A thorough cleansing of the skin of the face, especially that of the forehead, eyebrows, lids and nose seem elementary, but for some odd reason is not always practised. But when one has observed stitches and swab sticks brush against bare skin, when the operation towels become disarranged or are not applied carefully in the first place, it seems obviously necessary to remove

as much of this source of infection by using simple soap and water, or else hibitane and quarternary ammonium compounds. Simple painting of antiseptic on a dirty, oily skin will not be effective. A good mechanical clean up of the skin, followed by the application of a reliable antiseptic is the obvious method.

Sedation before Operation

The aim of giving sedation is to produce a relaxed, tranquil patient, who is only partly aware of what is happening, is not frightened or worried by it, and who has lost the will to resist any manipulations which might be felt. At the same time, the patient should be able to cooperate to some extent if required by the surgeon, though this should not be needed.

In areas where hashish (cannabis indica) or alcohol habituation is common, it is necessary to give a much larger dose than normal. The tendency for addicts is to omit their usual ration of drug before the ordeal of operation, which results in their becoming much more restless and sometimes completely uncontrolled at operation. Professor Sir Robert McIntosh used to say in his lectures that if a man is an alcoholic, one should give him a double dose of whatever alcoholic drink he usually takes at one time, and give it to him an hour or two before operation. This would result in a peaceful operation or in a peaceful induction of general anaesthesia where necessary. I have repeatedly found that this is true by experience for alcoholics, and the same applies to hashish addicts. They always deny taking the stuff anyway, and the advice is therefore disregarded, amounting almost to an insult, and thereby making things very difficult indeed at operation for all concerned.

The usual pre-operative drugs given in eye camps are Sod. Phenobarb 60 mgm, chlorpromazine 25-50 mgm, trifluopromazine 10 mgm (given by injection), or chlorpromazine 50 mgm with Sod. amylobarbitone 100 mgm. The various drugs and combinations varied from clinic to clinic. But for an excited cannabis indica addict we have found that it is usually impossible even to begin operation unless we inject 100 mgm or even more of chlorpromazine intravenously in addition to his normal pre-operative dose. Even then, we often have to recourse to a general anaesthetic in addition, since the patients will often lie tranquil unless touched, but will then throw themselves about unless a general anaesthetic is administered, though perfect retrograde amnesia usually follows.

Mydriatics and Vasoconstrictors

I. Mydriatics

Short acting mydriatics such as homatropine and phenylephrine are used by many clinics, where the surgeons are uneasy about using atropine or hyoscine. The disadvantages of the short acting drugs are that they fail to control synechiae which may form after the first few hours, and have no lasting effect, which is required for the post-operative period.

Many of the above surgeons are accustomed to apply atropine in the form of drops or ointment to the conjunctival fornix after operation to rest the iris and assist in preventing the complications of adhesions and the vitreous surface, or lens capsule remnants if a capsulotomy has been done. Provided that an iridectomy is done at the time of operation no post-operative acute glaucoma can develop. And anybody who examines the dilated pupil after operation will usually find small post synechiae which have not been detected with the loupe. It is a humbling procedure to discover these, and one is led to wonder whether too much mydriasis is possible after operation for cataract extraction. To say that a constricted pupil holds back the vitreous face implies that this has been disturbed anyway, and is more likely to produce a pupillary block than have any other effect.

II. Vasoconstrictors

Phenylephrine when used as a mydriatic has an excellent vasoconstrictive action as well. It is however so expensive that most private organisations which organise eye camps are prohibited from using it.

But adrenaline tartrate in 1/500 dilution in the form of drops is an excellent vasoconstrictor and also has a short acting mydriatic effect, and has the advantage of being relatively cheap. It may be made up easily by any qualified pharmacist from Adrenaline Powder B.P. according to the B.P. formula, and adding more sodium metabisulphite to act as a stabiliser and reducing agent in hot climates.

Most local anaesthetic agents, especially amethocaine (anethaine, tetracaine, pantocaine,) nupercaine, and xylocaine (lignocaine) do cause some degree of reddening and vasodilatation of the superficial vessels of the eyeball. Capillary oozing at the time of operation is greatly lessened with the use of a vasoconstrictor before operation, and this is a helpful part of any pre-operative technique.

Anaesthesia

It should be said at once, even if re-emphasised later, that good anaesthesia forms 75% of any cataract operation.

It is a relatively easy matter to operate on a white, tranquil, anaesthetised eye, whose ocular contents recede into the globe after incision, which is motionless, and where the orbicularis and palpebral muscles are completely paralysed. Most surgeons with average ability and manual dexterity can make the incision and remove a lens from a normal eye and close it again without complications when the anaesthesia is perfect.

With good anaesthesia the complications are less, the time taken for operation, whatever the technique employed, is less, and the final results are better. And yet I have often noticed surgeons, skilled though they may be, struggling with a moving eyeball, a straining and complaining patient, the eye red from capillary oozing, and vitreous presenting or being lost. And the blame for all this, curiously enough, is usually laid on the patient. Such notes made after the operation as 'The patient did not cooperate', or even, 'bad patient' are still to be seen. Surely the task of the medical personnel concerned is to transform a nervous, jumpy patient into a calm one, who is neither worried nor feels any pain. If this is not done, the only honest note the surgeon can write is 'Bad anaesthesia'. It is the anaesthetist's task to see that 'bad patients' are transformed into good ones.

Although difficult to define statistically, it has been estimated that three quarters of the complications which occur at operation are due to faulty or insufficient anaesthesia, either motor or sensory. In our clinics, where all the nerve blocks and local anaesthetic drops are administered by nurses we find that about 10% of these are partial failures. If repeat blocks do not work, then we always administer a general anaesthetic after injecting atropine 0.5 mgm intravenously.

When we operate in areas where cannabis indica addiction is commonly found (estimated by some as 20% of the population or even higher) we find that there is resistance to all forms of sedation, analgesics and local and general anaesthesia. We find that the pre-operative sedatives are virtually without effect, and the local drops and facial and ciliary blocks are just as ineffective, even though repeated. We have to resort to giving a general anaesthetic after injecting 50 to 100 mgm or more of chlorpromazine I.V. before induction. Even then, we sometimes find that either is virtually useless, and we have to give chloroform by a regulated drip method or from a graduated inhaler in order to achieve relaxation and analgesia. Even then, these patients absorb so much anaesthetic before they become suitably anaesthetised that one is led into thinking that one is anaesthetising an elephant!

Ciliary or Retrobulbar Blocks

If a ciliary block is complete, virtually no other anaesthesia is required, and indeed some clinics resorted to this as their only method of anaesthesia, using surface anaesthesia only if partial failure occurred.

Drug Used

Most clinics used xylocaine (lignocaine) 2% to 4% solution and injected a volume of between 1 and 2 mils. In the nine or ten clinics which I visited, I saw virtually no difference in the efficiency of the blocks with any of the strengths used. In one series we tried using Nupercaine (cinchocaine) 1 in 250 or 1 in 500 with a very comparable effect. 1.5 mils of solution seems adequate.

It is obviously better to use a long acting anaesthetic agent when injecting large numbers of patients, because of the time lag involved. Most clinics inject the ciliary block ½ to ¾ hr before the patient is due to be operated on, which is the better method. a) It gives time for the agent to become fully effective, and if it fails an assessment can be made with regard to repeating the block or giving general anaesthesia. b) It also gives time for a partial retrobulbar haemorrhage to form and to be observed more easily. Large R.B. haemorrhages occur almost immediately and are obvious. It is the smaller or partial ones which are dangerous because they go unobserved, and which may result in many otherwise unexplained instances of vitreous loss, when the anaesthesia has appeared to be adequate.

Since most R.B. blocks in eye camps are given by trained nurses or other paramedical staff, and given very expertly, too, it is very necessary to impress upon them that partial or total failure of a ciliary block or the occurrence of a partial or total R.B. haemorrhage is an accident, and not the fault of a trained administrator. Many partial blocks or partial R.B. haemorrhages are not reported soon enough by the nursing staff because they have the idea that these are a reflection of their inefficiency or carelessness. It must be clearly taught that their efficiency also is measured by how many such occurrences they can report before the operation begins, thereby saving many complications at operation.

Additives.

Some clinics use 1/1000 adrenaline tartrate or chloride solution mixed with the anaesthetic agent to lengthen the time of anaesthesia by preventing the agent being dissipated in the orbital tissues and general circulation.

Others use hyaluronidase to favour the spread of the anaesthetic agent throughout the orbit — the very opposite effect. And, surprisingly enough, other clinics combine the two additives — with what effect it is difficult to estimate, except that one imagines that they cancel out each other.

We did a series of 100 consecutive ciliary blocks, 500 with hyaluronidase and 500 without, the same nurses administering the blocks by the same techniques, as far as could be observed. The effects on sensory and muscular anaesthesia were observed and noted in each instance. When the time came to assess the results, it was discovered that the blocks given without hyaluronidase had slightly better results than those with it, and so we ceased to use it. We use adrenaline tartrate 1/1000 2 mils to 250 mils of solution instead.

Technique of Injection

It is better to use a slightly blunted needle (to reduce the incidence of R.B. haemorrhage) and to insert the needle through the conjunctiva, which has already been anaesthetised with a drop of amethocaine. This is less painful for the patient than by thrusting a needle through the very sensitive lower lid. The patient should be asked to look up before the needle is inserted so that the point of the needle will have a chance of reaching the area behind and not below the eyeball.

Facial Nerve Block

The O'Brien method is generally favoured in the clinics of the Pakistan-Indian Subcontinent and produces the best muscle paralysis with the fewest injections and the smallest quantity of local anaesthetic injected. Usually 4 - 5 mils of solution are used and injected ½ to ¾ hour before operation. Both ciliary and facial nerve blocks should be given to patients in eye camps in batches of not more than 20 at a time in a situation where 4 operating tables are being used. Otherwise unexpected delay from some cause or other may cause the anaesthetic effect to wear off.

If a nerve block of the 7th nerve is not complete it is quicker to use the Van Lint Method, especially if it is discovered only when the patient arrives in the operating room. Here again, the nurse in charge of the case would be encouraged to examine and report any deficiency in blocks before the patient arrives on the table. About 8 - 10 mils of solution are needed for a Van Lint block, and a sharper needle can well be used, as for the O'Brien block.

Technique of Injection.

Fewer failures will be met with in doing an O'Brien block if a vertical oblong mass of tissue round the neck of the mandible is injected, instead of depositing all the fluid at one place. Dr Adelaid Gault of Australia discovered that 10% of the facial nerves dissected on cadavers, crossed the neck of the bone at a lower level than normal and are thereby apt to be missed if only a small area at the upper part of the neck is selected for the site of injection.

In doing the Van Lint block the usual error made is to inject the fluid too superficially into the subcutaneous tissues. It should be injected into the muscles and close to the bone.

General Anaesthesia

In spite of the fact that all normal precautions are taken and the usual medicaments for tranquilising and sedating the patient are given, there remain a small number of people who seem resistant to them all and at the critical moment are unable to co-operate. I have seen world famous surgeons in the East and in the West talk quite sharply to their patients who do not behave as they would like them to do. But this does not allay their fears, and there is no doubt that the administration of a general anaesthetic is the obvious and only remedy for operating upon some difficult adult patients and upon children.

In most of the eye camps I have visited the highest surgical skill and manual dexterity on the part of the surgeons was often contrasted with the deplorable standards of anaesthesia, both local and general. In many eye camps, in fact, they did not operate on children, simply because they had no anaesthetist present, nor indeed, any equipment for giving general anaesthesia at all.

Ideally there should be a competent anaesthetist available immediately during the whole time in which operations are being performed in eye camps. And this is not at all an unattainable ideal. In our clinics in Pakistan we do this by employing fully trained nurse anaesthetists, who can administer almost any kind of anaesthesia necessary at a moment's notice, simply because they are there and ready. It has been stated that 'difficult patients' and children can always be sent to the base hospitals for such anaesthesia, but this attitude seems to contradict the very

purpose for which eye camps are set up. If the children and some other patients can go to base hospitals, then why cannot an anaesthetist come to the eye camps? This is less necessary if the eye camp is near the base hospital, but much easier. And if the hospital is not near and the camp is in some isolated area, then there is all the more necessity for taking an anaesthetist as part of the team.

Chapter 4

Operation Rooms

Eye camp operation rooms should obviously be selected as far as possible the correct size to accommodate as many tables as required for the number of surgeons operating and the number of patients expected.

If surgeons operate using the swift methods of dealing with cataract extractions which must be adopted in eye camps, then one man can manage three tables with comfort, and even four tables, without causing delay at any one table. This assumes that there are no unseemly complications, and therefore approximates to normal usage. But to accomplish this, the surgeon needs to be deft, calm, accurate and unhurried in his movements, and in order to waste no time, he should have an efficient assistant staff.

The operating room must be ventilated and fly screened with wire gauze as an elementary precaution. Nevertheless I have seen camps where there has been no such fly screening, but where, owing to the relatively dim light of the interior of the room, only a very few flies penetrated. But still, this practice is far from desirable, as flies are very apt to come into the room sitting on patients who have come in from a verandah. So the verandah, too, should be screened, if possible, and the main pre-operative preparation done there.

Equipment for Operation Rooms

a) Operating Tables

For those who prefer to operate standing, any ordinary portable table is adequate. A light metal one which can be dismantled and re-assembled easily is a real advantage.

For those who operate while sitting, the portable tables designed and used by Dr S. Adhvaryoo of Gujerat are easily the best I have encountered. These can be adapted for those who operate standing, and have the benefits of being simple, light, strong, easy to erect and dismantle. They fold flat and are easily portable.

b) Instrument Tables

There should be at least one of these for each operation table, depending on the system of assistance adopted in the particular camp, but additional shelves or tables are always an advantage if there is sufficient space.

c) Operation Towels or Drapes

There are several types of these. They should be at least large enough to cover the head and upper part of the chest.

For clinics where only one eye is operated on at one sitting, only one hole in the towel, large enough to display one eye, is required. But where a large number of patients with double cataracts attend, some clinics find it not only kind to the patient from an economic point of view, but also perfectly safe, to operate on both eyes at one sitting. In these procedures a larger oval or longitudinal hole, to expose both eyes, is made. If only one eye is to be operated on, the nurse covers the other eye by folding the lateral part of the hole and fastening it with a small towel clip.

These should all be autoclaved at the base hospital and brought to the operating clinic in drums, sufficient in number for use at the camp. Otherwise a portable autoclave must be carried as part of the camp equipment, and supplies of autoclaved materials kept ready.

Some camps report that when their supply of sterile towels runs out, the surgeons have to use towels soaked in dettol or other disinfectant and laid wet over the patients' faces. As well as being unpleasant for the patient and making it difficult for him to breathe easily, it is very doubtful whether sterility is achieved, and it seems obviously worth while to make an emergency trip back to the base for more autoclaved supplies before the supply runs out.

In all instances the careful draping of the towel is essential. It may seem very basic to assume that the nurse applies the towel carefully to cover all unsterile areas, but on some occasions in eye camps I have observed the towel to slip, and the fingers of the surgeon and assistant have actually been seen to touch the unsterile areas of skin and hair. The bridge of the nose, and the skin of the eyelids and all round the orbital margins must be carefully cleaned

and sterilised before the towel is applied. No stitches must be dragged across any areas of skin or eyebrows, even though these have been cleaned.

All this may sound like ABC to the ophthalmologist accustomed to unhurried operating in a well equipped base hospital where staff is plentiful and time is of little or no consequence, but it can and should be basic for the staff of an eye camp. Surgical and nursing staffs of eye camps are usually even more skilled and efficient in operating than ordinarily occurs in base hospitals, and are selected on this basis, but, where large numbers of patients have to be treated, the weather is hot and oppressive, the pressure of work is heavy and the time at their disposal is limited, ordinary human failings creep in, and mistakes are made, which sometimes result in disaster to the patient.

d) Swabs or Cotton Buds

Many clinics use cotton wool swabs rolled between the palms of the hands to the shape of a cigar and then autoclaved. This is perfectly satisfactory if only one end of the swab is handled. But I have observed in several clinics that the assistant has handled both ends, using the swab several times, and using it even to clean out blood etc from the anterior chamber. Even if the nurse or assistant has her hands washed and cleaned with spirit on frequent occasions, it seems too risky to adopt this practice with any degree of certainty as to the sterility of the swab. It is quite true that in the course of such a practice they 'get away with it' many times and no sepsis occurs, but it is much better to adhere to the rule that anything that has been touched by hand must on no account be introduced into the anterior chamber.

It is much more satisfactory to wind small cotton wool swabs onto sticks (commercially known as Q-Tips) and these home made applicators serve the purpose very well, can be autoclaved, used only once without being touched by hand, and then discarded.

Instruments

Sterilisation

Sharp instruments such as von Graefe knives, razor blades, or needles, can be sterilised by a high speed autoclave, if the camp is lucky enough to possess a few and the voltage of the power supply is adequate to maintain the autoclave at its correct performance level. But ordinarily, especially in isolated areas, they can be quite well sterilised by chemical methods. Some clinics use a hot air oven, others immerse the instrument in lysol, then spirit, and then rinse them in sterile water. Others sterilise their sharp instruments in alcohol alone and do not rinse them before putting them into the anterior chamber, in making an incision for example. This may sound dangerous and unorthodox, but in practice many thousands of incisions have been made by knives sterilised in spirit and immediately thrust into the anterior chamber without causing any harm which can be observed, and without sepsis occurring.

Scissors have a serrated edge and are not disturbed on boiling as often as necessary. Needles can be separately treated in a hot air oven, or, if they are ready threaded, they can be autoclaved and then kept in lysol and spirit and rinsed in spirit before use.

Eye Pads and Dressings

These should be autoclaved at the base hospital en masse and brought in separate bags or drums for use as required in the eye camp.

Operating Masks and Caps

There are enough bacteria in the air in the ordinary camp operating room without adding to this number by not wearing caps and masks, but I observed in some clinics that caps were not worn, though the wearing of operating sterilised boots was mandatory! It seems that caps and masks are essential, but where the patients come into the room wearing their own clothes, as they must do in almost all eye camps, the wearing of cotton sterilised boots seems not to be necessary. Operating floors should always be washed out twice daily with disinfecting fluid and kept moist, and this is not difficult to do.

Operating Gowns and Gloves

a) Gowns

In the atmosphere and conditions which prevail in eye camps, where many hundreds of operations are performed each week, there is not the time for the ritual of changing gowns between each operation, nor are there sufficient gowns available for this purpose, nor is it found in practice to be necessary.

In some clinics I have observed that sterilised gowns are issued to the professor or senior surgeon of the clinic which are worn for several operations. This is right enough for the first

operation, but I have also seen the same surgeons get up and walk round between operations, and leave their hands down, touching the back and sides of their gowns which have already come into contact with the operating stool. This is not mentioned as a criticism of the surgeons, who were almost exclusively beautiful operators, but to emphasize that if sterile gowns are employed in eye camps, they should either be renewed between each operation, or else the surgeon must keep his hands above his waistline at all times to prevent contamination.

A more sensible procedure seems to be to have plenty of well laundered gowns with shortened sleeves to be worn for several operations, and to scrub properly and observe a proper non-touch technique during and between the operations rather than to pretend that a gown is sterile and touchable after one operation. Once a surgeon imagines that his gown is sterile or his hands are sterile, he is apt to make serious mistakes.

I believe that a non-touch technique must be rigidly observed and maintained, so that nothing that enters the anterior chamber has been touched directly or indirectly by hand, and I am convinced that non-observance of this rule, especially in rush periods, results in the majority of instances of post-operative sepsis, even though these may be extremely rare.

b) Gloves

The same problems arise here. If a complete scrub and change of gloves is carried out between each operation, the practice of wearing them is clearly excellent, but where can hundreds of sterile gloves and gowns be produced for each day's operating in an eye camp? The funds and organisation, the expenditure of fuel and labour to produce such astronomical numbers is nearly inconceivable, and I feel that such expenditure of time and money and labour is misplaced and not necessary.

The only instances in which I have seen gloves used in eye camps for cataract surgery was where the professor was using them at one table for demonstration purposes, using lengthy techniques. As a result his assistant professors and other surgeons were doing four or five similar operations without gloves in the time taken for him to do one, and with no demonstrable difference in the results. Such a situation has its farce-like qualities.

Chapter 5

Operative Techniques in Eye Camps

1. Pre-operative Procedures

a) Cleansing of Conjunctival Fornices

Most clinics are content to swab out the fornices with saline solution on swab sticks, but some use 'Savlon' solution, and others swab with savlon solution and follow this with an irrigation of the fornices with 1/4000 solution of Mercuric Chloride. This latter procedure produces a chemical coagulation of all surface proteins including bacteria and is intended to induce a sterile conjunctiva and cornea for the time of operation and immediately afterwards, until the wound closure has become sealed with fibrin. This occurs within 3 to 4 minutes where a limbus based conjunctival flap is used with the knife incision, or where it is dissected down from above.

However, from my own observations I have not found any difference in sepsis rates, i.e. endophthalmitis, where the procedures differ. But some sort of mechanical washing or scrubbing appears to be effective, whatever the fluid used. I am more and more compelled to believe that intraocular infection is produced by introducing bacteria from outside. These gain access to the anterior chamber from careless sterilisation of instruments, swabs, towels, or from their careless contamination through human error, especially under conditions of stress or hurry.

b) Lid Sutures or Speculum Retraction

In various clinics visited I saw that two kinds of lid sutures were used. 1) Those inserted about 3 inches long, left loose, and taped to the cheek after operation to ensure correct closure of the eyelids until the facial nerve paralysis has disappeared. Sometimes one lid suture was used for the upper lid only. Sometimes upper and lower lid sutures were inserted and tied together after operation until the first dressing. These were admirable procedures.

2) Lid sutures used as retractors during operation. These are used in the majority of eye clinics now, and have become almost fashionable and nearly a status symbol. They do provide a simple method of retracting the lids, some men using up to three upper lid sutures, and others content with only one for each lid. They have the advantage of enabling the surgeon to work with an inexperienced assistant doctor or theatre nurse who does not know how to handle a

speculum, and thus relieve the surgeon of the worry of the dangers of a speculum held in an inappropriate manner. I believe that this is the reason for many surgeons having ceased using a speculum and for the general attitude which prevails in so many clinics that the speculum is now antiquated, if not obsolete.

Critics of the speculum say that it is unnecessary, gets in the way of the operator at times, presses on the globe and is therefore liable to produce a higher loss of vitreous at operation. I agree with these criticisms as a whole if the speculum is misused and handled without skill and intelligence. But I have seen just as much vitreous loss at clinics where speculums are not used or even more than where they are used as a routine. Far from blaming the speculum for vitreous loss, I am certain that it is a very potent and useful instrument in preventing it.

Some operators used a fixed speculum, and others a freely moving Smith type, which is the simplest. When this is held by an experienced and sensitive assistant, and raised vertically directly after the incision is completed, it will be seen that it produces a pronounced Fleiringa effect on the globe. In the place of upward tension on a Fleiringa ring, causing the globe to hang from the ring and the vitreous drop back into place, the very same effect ensues from the raised speculum acting on the conjunctival fornices. The globe then hangs down from the speculum in the same way. I have found many visiting surgeons to our clinic who have had years of operating experience, but have never seen this effect produced, and are amazed at its efficacy.

This Fleiringa effect can be produced at any time during operation and enables the operator to raise the corneal flap and remove the lens with increased safety and ease. If the capsule breaks during removal, the remnants can be grasped without fuss or hurry since they are lying on the vitreous which is lying back itself in a relaxed and concave shape. The iris reposition is also easier, since it can be tucked underneath the corneal or limbal shelf with accuracy. This is an obvious contrast to the procedure I have often witnessed in clinics where the speculum is not used, and where the iris has to be tucked in somehow or other, sometimes rather haphazardly pushed under the cornea with always the attendant danger of rupturing the vitreous surface, which is anyhow bulging enough to render the cornea highly convex and the surgeon somewhat nervous. The Fleiringa effect of a properly used mobile speculum has immense advantages and merits far more extensive use than it has at present.

It was found that surgeons in the North of India and in Pakistan used lid sutures more generally, while in central and South India the speculum was more commonly favoured than stitches.

c) Trachomatous contracted Fornices and Sockets

Where the surgeon finds a socket badly contracted by trachoma or other cause, so that the speculum will not fit in properly, but where it does fit, the tension caused by the speculum on the contracted sockets will tend to cause pressure backwards on the eyeball, somewhat similar to a tight bowstring effect, instead of the reverse purse string result required. This will produce a prolapse or loss of vitreous as soon as the incision is made. So the surgeon must walk warily in the presence of severe trachoma, and if the socket is found at all contracted, he must incise the conjunctiva in the fornix or fornices from one canthus to the other, if there is any remaining contracture. Then the speculum may be inserted, but its Fleiringa effect seems almost lost.

The Incision

In Eye Camp surgery practised in the Indian subcontinent, we found that most surgeons preferred the von Graefe knife to other methods. Its obvious advantages are speed, a clean cut with almost no manipulation of the eye, and the need for introducing an instrument into the anterior chamber only once to produce the desired effect. The knife incision also produces a bevelled, oblique cut at the limbus and enables a conjunctival flap to be lifted up with one motion.

It naturally takes longer to acquire the skill and manual dexterity for its use in order to produce a clean and accurate cut, and is therefore not the instrument for use for the occasional operator. But, where a number of cataracts have to be removed in one day, the knife incision is clearly superior.

This is not to say that an excellent and accurate incision cannot be made by a knife, razor blade or keratome and then enlarged with scissors, but all this procedure takes time, and sometimes produces a ragged incision with vertical sides, besides having to introduce the instruments several times into the anterior chamber. These manoeuvres also require practice, but take five or six times longer than the single cut produced by the knife, even in the best hands.

After the incision is completed, the cornea should be wrinkled or concave when the aqueous fluid has escaped. If the cornea still remains convex, the speculum should be lifted vertically to produce the Fleiringa effect, and it will be observed that the wrinkling or dimpling of the cornea will then become apparent in most instances.

If the cornea still remains convex, then it must be concluded that there is still incomplete ciliary anaesthesia, or that a small retrobulbar haemorrhage is present. It is at this stage and in these circumstances that I have often seen rash or inexperienced surgeons attempt to remove the cataract in its capsule — with poor or sometimes disastrous results. I cannot too strongly advise any surgeon to resist the temptation to try his skill at an intracapsular operation in these circumstances. Attempts to remove the lens by forceps or cryo extraction in situations like this may result in vitreous prolapsing into the anterior chamber or else a large tear of the vitreous surface with loss of vitreous substance, sometimes in large quantities. It is possible that sometimes success is achieved and the operator may 'get away with it'. But this produces a false sense of confidence, and may give the surgeon an inflated idea of his own prowess, which is soon abolished if he finds that the next eye on which he operates in similar circumstances, with a bulging cornea after incision, loses a large amount of vitreous. A properly executed extraction with capsulotomy is the correct treatment with a post incisional bulge, and it will be observed that the posterior capsule of the lens is an excellent barrier to the forward passage and rupture of the vitreous. Where there is any doubt, play safe and do a capsulotomy.

The object of cataract surgery, whether in hospital under ideal conditions, or in eye camps in difficult circumstances, is to do the best surgery for each patient, taking into account the peculiar circumstances of each eye. It is not right to follow a certain regime of procedure in every instance because the operator or the clinic director favours a certain established technique. The old proverb 'Pride comes before a fall' and 'Discretion is the better part of valour' are salutory reminders at times of failure that all operators are human and fallible, however much experience and competence they may possess. Every surgeon must keep it very clearly in mind that each eye demands and should receive the best treatment for its own particular needs that the surgeon can give, and is not a means of demonstrating the operator's favourite technique nor his manual dexterity, though this may be superb and masterly.

Chapter 6

Wound Sutures in Eye Camps

During the last 35 years the practice of insertion of sutures before or after incision has become almost a sine qua non in cataract surgery. The generally accepted theory is that ocular wounds, like wounds elsewhere in the body, need to be carefully sutured in order to secure accurate apposition and healing. But this is only a half truth. Yet the increase in litigation in the U.S.A. and other Western countries has seemed to many people to be a perfectly sufficient reason to demand the use of sutures, and students have for years been indoctrinated with the idea to the extent that they cannot believe that an ocular wound will heal accurately and well without them. And furthermore a glance at many of the old techniques will show that in former years a large number of surgeons never employed sutures in cataract surgery (if there were no complications) and that their results were extremely good. And conversely one hears of wound leaks where three or even four sutures are inserted, and even the breakdown of wounds which have been carefully sutured may occur.

The general trend of surgery in the Indian subcontinent has been to use sutures in base hospitals where time is of little account and where students need instruction in their insertion. But the majority of surgeons who adopt this practice in base hospitals do not employ sutures in eye camp surgery but use instead a limbus based conjunctival flap to seal the wound, which it is found to do eminently satisfactorily.

The surgeons at the vast Sitapur complex of eye hospitals in North India which consist of a huge base hospital of 1,600 beds and 30 branch hospitals, all well equipped with advanced equipment and running 400 eye camps in the year, are all followers of the late Dr Mehray. He and his staff, Drs Kapoor, Mittra, Paul, and Kaul employ one preplaced 6/0 silk suture in the base hospital as well as in the eye camps. This suture is inserted by a technician when the patient is being prepared for operation. An incision is made with scissors transversely through the conjunctiva just above the limbus. The suture, threaded on a needle is passed from above through the conjunctiva and episclera, and then a second bite is made through the limbus and conjunctiva below, the intervening thread being drawn out of the way, and the end left long. The surgeon makes a 180 degree incision with the knife, coming out through the lips of the scissors cut in the conjunctiva, and then performs a peripheral iridectomy. The lens is removed with forceps and the iris replaced. The assistant ties the suture, cuts the ends short, and applies the dressings while the surgeon moves on to the next patient, similarly prepared. In this way, no time is wasted, and the operation takes only one or two minutes.

In Delhi, Professor Malik employs one suture for eye camp work, but Professor Madan Mohan uses three sutures in hospital and eye camps, but does comparatively few operations in the latter.

Dr Adhvaryoo in Gujerat in his eye camps dissects a conjunctival flap from above, makes a small razor blade incision, which is enlarged with scissors, inserts one 10/0 silk suture and extracts with a cryo, after which he inserts two conjunctival sutures. This procedure takes him about seven minutes altogether. His assistants usually use a knife incision with the conjunctival flap raised from below, otherwise the same technique is followed. Dr Adhvaryoo's team operates on anything from 200 to 300 cataracts in a day, using four tables.

The Bombay group of ophthalmologists used sutures routinely at the base hospitals, but in eye camps only when there was loss of vitreous or a limbal incision was inadvertently made with the knife. This group comprised among others Professors Patel, Ishwar Chandra, Sathe, Muljhani, Sardesai, Urseka and Maskati. Their standard of technique was superb, and their general ophthalmic standards, morale and humility were outstanding.

It was much the same story with the South Indian ophthalmologists. Professor Venkataswamy's group were most impressive in their enthusiasm, technique and elasticity of mind. Professor Krishnamoorthy of Coimbatore uses a knife incision raising a conjunctival flap, one corneo-scleral and two conjunctival sutures. Professor Selvam uses a similar technique but no conjunctival stitches. The other professorial staff in the group used sutures in base hospitals, but none in eye camps. This group comprised Professors Latif, Navamani, Natrajan and others, who used no stitches in their eye camp surgery, but made a knife incision, raising a conjunctival flap from below. They did a sector iridectomy, and extracted the lens with forceps with accurate replacement of the conjunctival flap, and the whole procedure takes in their hands about a minute to accomplish.

In Pakistan, Professor Kirmani uses stitches in hospital, but adopts a similar procedure to the Bombay group in eye camps. The Christian Caravan Hospital under Dr Heaton use a limbal incision and insert two or three sutures routinely, but only do about 15 or 20 cataract extractions a day. The group in Quetta and Shikarpur use a knife incision, raising a conjunctival flap from below, a sector iridectomy, and forceps or cryo extraction of the lens, with a capsulotomy wherever necessary. They use no sutures as a routine, but have certain fixed requirements for them, viz: 1) where a limbal incision is made either inadvertently, or 2) where it is necessary because of a previous drainage procedure for glaucoma. 3) Where there has been loss of vitreous, and 4) where a simultaneous drainage operation is carried out for glaucoma at the same time as a cataract extraction. This latter needs to be done sometimes because of economic reasons, where the patient lives at a great distance away, and either cannot or more likely will not return for a subsequent operation after a glaucoma drainage procedure with cataract present.

We spent many hours in seminars and in individual discussions as to the 'pros and cons' of using sutures in eye camps and took special note of those who had had great experience in operating both with and without them, since theoretical discussions not based on factual experience are worthless, and may merely reflect the unbending views of either side taking part. Where surgeons omitted sutures, they regularly used a knife incision, raising a conjunctival flap from below, and made a full or sector iridectomy. This method has the advantages of simplicity, speed, lack of complications and it was therefore necessary to compare the results of the operations done with and without sutures. Fortunately, I had adequate material as a basis for study, since the standard of operative technique was quite excellent wherever I went, and the operating teams dedicated and efficient.

It was not possible to investigate and comment on the late complications and long term results of those patients operated on at eye camps. The only way of assessing results and complication rates was to examine patients operated on by various methods in eye camps, both with and without the use of sutures, and find out the proportion of complications when the patients were discharged from hospital. It is also possible to compare the results of a large number of private patients operated on by sutureless surgery in our clinics and hospital in Quetta and Shikarpur in Pakistan, where one can follow up the results sometimes for many years in private patients.

During a tour on behalf of the Royal Commonwealth Society for the Blind in India in the spring of 1974 I visited many hospitals and eye camps from North to South of India. On occasions I have travelled over 400 miles in a day over rough roads in order to examine carefully the eyes of many patients operated on in eye camps and ready for discharge, and in various stages of convalescence after operation. This was a tedious and tiring procedure sometimes, but was very worthwhile and most instructive.

The interesting fact that emerged from observations on these patients was that very little, if any, difference could be observed in the results obtained either by employing sutures or not.

The rates of iris prolapse, hyphaema, or the presence of some blood in the anterior chamber, the wound closure, and the occurrence of sepsis did not seem to vary at all, or did so within certain small limits. And the unanimous opinion in discussions with the professorial staffs of those institutions where sutures were sometimes used and sometimes avoided was that there was no obvious difference in results, visual or otherwise.

This conclusion may come as a surprise or even a shock to many surgeons who have had no practical experience of sutureless surgery, but it is not propounded in order to be didactic or to force an issue, but merely to encourage an open mind on the subject. The same delicate care in operation and handling of tissues is necessary, and the same accuracy in opposing the wound surfaces so that the natural processes of healing can take place. I shall never forget my old chief in general surgery when he saw me as a house surgeon laboriously inserting many sutures in an appendix wound of the abdominal wall. He remarked, 'It doesn't matter what you do, Holland, the wound will heal up anyway, if the tissues are in position.' What impressed this on me most clearly was when we were conducting a series of 500 cataract extractions done with and the next 500 without alpha chymotrypsin. In those days one was advised to wait for four minutes after instilling about 0.4 mils of the solution into the anterior chamber after the incision and iridectomy was carried out. During the tedious interval of four minutes, the conjunctival flap wound had time to adhere to the bulbar tissues, and when the time came for the operation to proceed, the flap had literally to be peeled off the globe in order to open up the anterior chamber. We have seen that this healing invariably occurs when the flap is properly made and replaced at the end of the operation, the only exceptions being when vitreous fluid is lost at operation and some is left between the tissues, or when a simultaneous operation for filtration for a concomitant glaucoma is performed together with the cataract extraction. But if the incision is limbal or slightly corneal, then stitches must be applied, as the healing is not so certain, though in the old days I can only remember about 5% of such wounds not being healed soundly on the first dressing.

Chapter 7

Post Operative Complications in the First Ten Days

The following were the averages for the various clinics in India and Pakistan which I visited and where I had opportunity to examine every patient personally with a binocular loupe, together with the figures given to me in interviews and seminars with professorial staff in the main centres.

Hyphaema or the presence of Blood in the Anterior Chamber. Average 2%, though in one series of 177 patients there were only two (in both of which sutures had been inserted).

Iris Prolapse ½ - 1%

Flat or Shallow Anterior Chamber 1-10%. But none on discharge.

Vitreous loss 1 - 2%

Sepsis 1/2000 or less - 1%

Expulsive Haemorrhage 1/500 - 1/3000.

Comments:

Hyphaema

It was generally agreed that the incidence of hyphaema or some blood in the anterior chamber mostly occurred between the 5th and 7th days post operatively.

Broadly speaking, these could be divided into three groups:-

a) Small quantities of blood in the anterior chamber. These always absorbed in 2 - 4 days whether they occurred early or between the 5th and 7th day after operation.

b) Larger amounts of liquid blood, forming a definite fluid level. These are innocuous and are always absorbed in a few days, and sometimes surprisingly quickly within 24 to 48 hours.

c) Larger amounts of blood which fill the whole anterior chamber.

1) If the blood is liquid and the ocular tension is normal these should be left alone to absorb in a week or so. Sometimes absorption seems very slow at first, and just as the surgeon is contemplating interference of some sort, the blood obligingly disappears in one night.

2) If the blood becomes clotted and assumes a red or pale brick colour, and if the tension is normal, the clot will again absorb if given time, but it may result in some iris adhesions forming with consequent distortion of the pupil. The decision to do a paracentesis and removal of the clot by milking or extraction with forceps is a difficult one to make, but is usually rewarded by seeing a quiet eye with a clear pupil in a day or two.

3) If the blood has formed a black clot (the 'Black Ball Eye' or as the Americans call it, the 'Number 8 Ball Eye' from their associations with snooker or rather "pool") the tension will almost certainly be raised and the patient will rapidly lose his sight permanently unless the clot is evacuated. The wound should be boldly opened up for a distance of 4 to 5 mm and the clot milked out or removed with forceps. The anterior chamber should then be irrigated with 1/25000 solution of crystalline penicillin, the wound closed, and penicillin or other antibiotic should be injected subconjunctivally. The operation is almost always a very rewarding procedure and usually fairly simple. But the condition has to be diagnosed from a massive vitreous haemorrhage coming out into the anterior chamber, which is fortunately a very rare phenomenon.

In practice, the common and lesser forms of blood in the anterior chamber can be disregarded, since they do not produce any lasting damage to vision. It is only the rare, large adhesive clots or the black ball eyes which are potentially dangerous and need rapid and active surgical management.

Iris Prolapse

This varies from a tiny incarceration at one corner of the incision to a large prolapse, which may be bare or under a flap of conjunctiva.

In the majority of instances it is associated with the presence of vitreous fluid in the anterior chamber or actual loss at operation. In some instances the iris is not properly replaced at the end of operation, but usually the vitreous floats the iris up into the wound and the prolapse occurs if the wound has not been securely sutured. Once vitreous is present, three or five sutures are needed to produce a firm closure.

When there is no vitreous rupture, the use of a knife incision to produce a bevelled edge and the speculum to produce a Fleiringa effect are great advantages in enabling the operator to tuck the iris properly in behind the scleral shelf where it belongs.

Flat or Shallow Anterior Chambers

Much has been written about these, but, apart from wound leakage or an air bubble which has been wrongly inserted behind the iris, the only other reasons seem to be a failure in secretion by the ciliary body or a choroidal detachment with accumulation of fluid behind it.

A few practical points are worth mentioning:

1) How long can a chamber remain flat before peripheral adhesions develop to close the filtration angle and render a secondary glaucoma liable to occur? I am unaware that this interval has been determined by animal or other experiment, and may possibly be longer than has been assumed, depending on the amount of fibrin produced by trauma to the eye at operation and on the counter inflammatory effect of locally applied steroids. If there is no iritis present, the tension is normal and the wound healed, it has yet to be proved that there is any need for active intervention before a week or even ten days has passed.

2) If a sector iridectomy has been carried out, a sufficient gap is left over Schlemm's canal for drainage and the danger of secondary glaucoma is greatly diminished.

3) The drainage of a choroidal detachment, if one exists, is easy and effective, and can be combined with an air bubble inserted into the anterior chamber to restore the shape of the collapsed globe and cornea.

4) Although it has been the custom of many surgeons to apply a firm bandage to the eye in the presence of a flat anterior chamber, and to administer diamox or similar compound, in an attempt to reform the anterior chamber, it must also be recognised that a) many surgeons leave off the bandage completely (if the wound has healed) and allow the patient to walk about wearing a pair of dark glasses or an eye shade — and achieve restoration of the chamber in that way; and b) that it is a common experience for an ambulant patient to be sent to the operation theatre for operative interference for the reformation of his anterior chamber, only to find that when he arrives and is prepared for the procedure, the anterior chamber is observed to have formed already; and that c) the anterior chamber can form, disappear, and reform twice or oftener in the course of the first ten days of post-operative care, even though the surgeon may be satisfied that no wound leakage is occurring.

Vitreous Loss or Disturbance

Basically, any operation for the extraction of a cataract must be aimed at disturbing or harming any part of the eye as little as possible. Although most ophthalmologists have observed no apparent harm or lessening of vision for years in eyes in which vitreous rupture has occurred, yet there have been many disastrous results and complications due to rupture of the surface and loss of the vitreous fluid.

In my experience there are four main causes of vitreous loss:

1) Poor anaesthesia, either surface anaesthesia, or an ineffective ciliary block or an incomplete facial block.

Too often have I seen impatient surgeons in eye camps attempt to operate on eyes which are rolling round or looking up, and even where some activity of the orbicularis or lid muscles is still present. Perhaps the blocks may have been given incorrectly in the first place, and sometimes the surgeon or nurse may not have observed this. An anaesthetist may not be immediately available to administer a general anaesthetic to produce complete relaxation, or that the patient is a chronic addict to alcohol or cannabis indica. Or else the surgeon may have felt unwilling to administer a second nerve block or a general anaesthetic because of possible objections by the patient.

The reason why local anaesthesia may not have the correct effect in certain patients is obscure, since very experienced men, surgeons and trained nursing staff, who have administered many thousands of blocks do not always achieve success, and may sometimes have three failures in three consecutive attempts. We have observed that about one in ten local block anaesthesias is short of complete and where this is so, a general anaesthetic is the procedure of choice, and transforms what would otherwise be a nightmare experience, demanding the utmost skill and dexterity on the part of the surgeon and his assistants (and even then not always successful) into a quiet, simple and straightforward procedure. It cannot be too strongly emphasized that the main key to success in cataract surgery is correct and effective anaesthesia, and conversely that the great majority of failures are due to lack of it.

2) The second most common cause of vitreous rupture or disturbance is an attempt to do an intracapsular removal of a cataract when the cornea shows no wrinkling or dimpling after the incision, but instead retains its normal curve when the speculum is elevated. In these events the vitreous is obviously disturbed and the intraocular tension is raised. The posterior capsule will remain the only means of preventing vitreous substance from pushing forward into the anterior chamber (and even out on to the patient's cheek), and so the posterior capsule is best left where it is by doing a planned capsulotomy extraction. I am sure it is wrong for the surgeon to attempt an intracapsular operation just because he thinks that he is sufficiently skilful to 'get away with it'. The object of surgery is to give the patient as good vision and as normal an eye as possible, and not to provide a means to test the skill of an over confident surgeon.

3) Concealed or partial retro-bulbar haemorrhage forms a trap into which the unwary surgeon doing cataract extractions in a busy eye camp may easily fall. The detection of this complication of a retro-bulbar nerve block may be difficult, and is in fact too often missed altogether. Nurses and assistants should be very carefully trained to observe this and point it out to the surgeon if they have any doubts about it. Its occurrence is much more easily detected if a speculum is used, since it can be seen that there is much less room in the fornices when the speculum is raised.

In these circumstances and in the detection of an incomplete facial or ciliary block the presence of a well trained assistant who prepares the eyes for surgery is a real boon. Assistants must all be clearly told that an incomplete nerve block given by them, of whatever kind, does not reflect on their efficiency or skill, and that they should report this in good time for the anaesthetist to administer a general anaesthetic should this be needed if a repeat block fails. I have seen too many eyes either ruined or left with imperfect vision because of impatience or unwillingness on the part of the staff to admit failure. And the failure of the operation is often wrongly attributed to non-cooperation on the part of the patient. I have even observed one of the most famous ophthalmic surgeons in the world guilty in this respect, and which surgeon is quite free of blame?

4) The fourth obvious reason is an intracapsular extraction on a young patient whose vitreous surface may be attached to the back of the lens capsule. Any attempt at removal of the lens with its capsule will inevitably end in complete disaster with a huge loss of vitreous.

Sepsis

It must be recognised in the first place that arrangements to eliminate sepsis in cataract surgery in eye camps are extremely difficult. Briefly, the condition of the buildings and surroundings in which the operations are carried out is often very primitive. The patients arrive dusty, with hair and faces unwashed, and wearing dirty clothes. Their mouths are often quite filthy, and no ordinary ophthalmic surgeon, presented with a patient with such poor oral hygiene, would dream of operating until this was cleared up.

But, in actual fact, the post-operative sepsis rate for these patients varies little from that of the sophisticated private patient, washed and clean, with impeccable oral hygiene. I cannot but assume that the infective organisms in all instances are introduced from without, and are not endogenous.

The aim of the surgeon in eliminating sepsis in eye camp conditions is to make and keep the

small area of operation clean and sterile for the period of the operation until the dressings are applied. Once the wound is closed, it is extremely doubtful whether any organisms can gain access to the anterior chamber from without. For this reason, the techniques of sterilisation of skin, fornices, the surgeon's hands, the operation towels, and above all the instruments which actually penetrate into the anterior chamber, should be completely sterile. A no-touch technique should be mandatory, and it should be in practice what it is meant to be in theory. Since in eye camps it is not possible to use a fresh pair of gloves or a fresh gown for each operation, nor even to assume that the surgeon's hands are sterile, it is necessary to insist that everything that goes into the anterior chamber or vitreous, especially swabs, must on no account be touched by hand, nor even to touch that part of the sterile towel on which the surgeon has rested his hands. It is impossible to sterilise the air, so that the sooner the anterior chamber is closed, the better. Consequently, the less manipulation and time consumed during operation, the less likelihood there is of stray organisms gaining access to the anterior chamber. Antibiotics, when suitably administered, can play an effective part in preventing infection.

Expulsive Haemorrhage

This is a disaster, which, happily for most surgeons, is seen only by those who perform or have observed many thousands of operations for cataract extraction.

Its incidence varies from 1% to 1/5000 in different clinics, and usually occurs within the first few minutes or hours after operation when the patient is lying in bed. Occasional disasters occur while the patient is actually lying on the table itself. I know no way of preventing this catastrophe, except an immediate posterior sclerotomy if the bleeding occurs when the patient is actually being observed on the operating table. The haemorrhage may follow a carefully done operation on a soft eye without complications. I have seen it happen when three or more stitches have been inserted at operation. A very experienced professor told me that he had seen it occur at the end of an operation on a colleague's wife, and he described how the haemorrhage tore out nearly all the carefully inserted corneo-scleral stitches. Merely to see its occurrence is a terrifying and humiliating experience. The occurrence of expulsive haemorrhage appears to bear no relationship to a raised blood pressure, nor to the way patients are handled after operation (i.e. whether they walk back to their beds, or are carried very carefully on stretchers). It remains a mystery, and because of its extreme rarity, the cause is extremely difficult to determine.

Chapter 8

Common Operative Procedures in Eye Camps associated with Cataract Extraction

Generally speaking the most sensible operation to perform for cataract extraction is the one which is simplest, least time consuming, and with which the surgeon is most familiar. The surgeon should be ready and willing to alter his technique to suit eye camp surgery, and especially to suit each individual type of cataract and patient. Eye camp surgery demands elasticity of mind, dexterity of hand, and constant readiness to assess and reassess every patient, besides prolonged and arduous physical exertion. The variety of pathology seen and of operative experience to be gained by the discipline of active participation in one of these camps can be of great benefit to even the most experienced ophthalmic surgeon.

The Use of the Superior Rectus Stitch

This is a much misused stitch. Too often it is used to attempt to steady the eye when the ciliary block is ineffective. This amounts to an admission of failure, and an active superior rectus muscle, not affected by the ciliary block for some reason or other, is a menace, even in the presence of a superior rectus bridle stitch. I have seen too many surgeons operate on too many rolling or upturned eyes, and resorting to the aid of a superior rectus stitch when they should be using anaesthesia or relaxant to make the block effective and the operation safe for the patient.

The only situation where the use of the S.R. stitch can be justified is when the superior rectus is only partly blocked, weakened considerably, but still active. In these instances the muscle should itself be infiltrated with local analgesic solution and the stitch applied. But even this can be a dangerous procedure, and I have observed much vitreous fluid lost when tension on the stitch has been applied, even by an experienced surgeon.

The remedy for an active superior rectus or other cone muscle activity is to do a re-block of the ciliary ganglion, and if this also fails, recourse must be made to general anaesthesia, with or without a relaxant. This will result in a quiet motionless eyeball and patient on whom the

operation can be done with ease and efficiency, or, as the Germans put it, 'Mit eile, kraft und gewandheit.'

Air Bubble Insertion

Many experienced surgeons I met in the various clinics in India and Pakistan have given up this procedure entirely as a routine procedure, since they can see no value in it.

In situations where there is vitreous fluid in the anterior chamber, and an attempt has to be made to give a space for the aqueous to form between it and the corneal endothelium, or in instances of extreme hypotony after some cataract extractions, for example after the drainage of a post-operative choroidal detachment, there is an indication for its use in cataract surgery. But in routine cataract extractions I find it difficult to understand any reason for the insertion of an air bubble, as the aqueous forms perfectly satisfactorily without it. It is doubtful if it has any beneficial effect in the ordinary procedure, and may even do more harm than good.

If the needle is not inserted carefully into the wound, it may actually penetrate an otherwise intact vitreous hyaloid membrane and set free vitreous fluid into the anterior chamber when it was not present before. The air bubble may also go behind the iris and I have sometimes observed the iris being pressed forward against the cornea by the air bubble. Is there any real evidence to show that the insertion of an air bubble does in fact make it easier for the anterior chamber to form than without it? On the other hand, if a speculum is used for the operation, producing a Fleiringa effect, the vitreous and iris sink back into the globe and a space is left between them and the cornea. When the cornea and conjunctival flap are replaced a spontaneous air bubble is often formed, which does no harm, and merely demonstrates that the vitreous surface has not been disturbed.

Canthotomy

This is a valuable procedure in countries where trachoma is endemic, since a large proportion of the eyes operated on for cataract have contracted sockets and make operating doubly difficult.

In these situations where there is any doubt at all about whether a canthotomy should be done, the answer is invariably 'Do it'. This simple procedure is not practised nearly enough, and should be a standard procedure in many of the patients who come for operation.

In some sockets seen with advanced scarring of the fornices due to trachoma, in addition to canthotomy a division of the contracted conjunctiva in the fornices above and below leads to or makes all the difference between a difficult and a reasonably easy operation.

Capsulectomy

After the occurrence of a burst capsule or a planned capsulotomy, the operator is often left with a large piece of anterior capsule, which may be very thickened and calcareous, and needs to be removed. The operation of capsulectomy is not easy unless the Fleiringa principle is used. With the mobile speculum properly raised the vitreous surface drops back into the globe. The cornea is then raised and lifted out of the way by the assistant who grasps the conjunctival flap attached to it. The operator can, however, do this with his left hand. The capsule is then grasped at leisure and eased out of the zonular attachment, leaving the vitreous still in place. Not unless this procedure is actually witnessed, can it be understood how simple it can be. It should be carried out far more often, but I hardly saw it at all during our whole tour of India.

Chapter 9

Bilateral Cataract Extraction

The very idea of this double operation on the same patient at one sitting naturally raises thoughts of horror in the minds of most ophthalmologists. In developed countries where facilities for the patient to obtain treatment for one eye at a time are simple enough, the problem does not usually arise. But in the rural areas of developing countries where communications are difficult and the economic and social pressures on the patient staying away from home for a long period (sufficient to do one eye at a time), or for making two long journeys to the hospital or eye camp for two successive operations — are very great. After all, the questions uppermost in the minds of most country dwellers in this situation are 'Who will look after me in hospital, or take me there and back? Who will look after the children when I am away? What will happen if the cow or camel calves? Who will there be to look after the irrigation water when it comes, or to see it comes to us at the correct time?' etc etc. The Western urban mind does not readily appreciate such mundane and simple domestic and economic matters. In the West, so much is 'laid on' for the patient, and life is made so much more easy and less primitive. We forget how lucky we are to live in the West in so many ways.

Our experience in Quetta and Shikarpur in Pakistan has been that we do thousands of double cataract operations at one sitting every year, since so many patients arrive with both eyes quite blind with mature cataracts. We have hardly ever had the cause to regret this procedure, since the number of disasters we have had because of it in the last 35 years could be counted on the fingers of two hands, or even of one hand. It is a common thing, as everywhere else, to have complications of some kind, even sepsis, in one eye, but not affecting the other, and we believe that there is no more risk to the double operation than if the two eyes were operated on at different times. The saving in time and money to the patient and to his friends or relatives who accompany him is immense, and the price paid for the policy is only a handful of disasters over many years. Bilateral cataract extraction at one sitting is a procedure which should be done more often, and certainly as a routine in eye camp surgery.

Cataract Extractions in Children

Cataract operations on children are hardly done at all in eye camps in India, the reason being given that the problems of anaesthesia presented too great a difficulty in the eye camp situation. But how many children are therefore prevented from coming for surgery, since the base hospital is too far away? In isolated areas proper provision must be made in eye camps for ordinary general anaesthesia with equipment for intubation, which is almost always necessary. This is not difficult, and there is no reason why eye camps should not be provided with sufficient facilities for this, and for use wherever local or regional anaesthesia has failed, or is unsuitable for the patient for other reasons.

Post Operative Dressings

Ideally it would be best not to have to apply any dressing at all on the eye after cataract extraction, but apart from fastening the patient's hands to the bed and keeping his head in a kind of clamp, it is difficult to conceive of a method by which the patient would not be able to interfere with his eye during sleep and waking hours. The object of the dressing is mainly protective and can afford a degree of comfort and freedom from photophobia if this is present.

The sometimes irresistible urge of patients to 'fiddle' with their eyes or to remove the dressings to find out whether they can see or not is common to all races and occurs even in the best clinics. To prevent this, some clinics do actually bind the wrists of the patient for the first 24 hours, and others rely on the use of plastic guards over the orbit, incorporated in the bandage. Other clinics do none of these things. And, in spite of even the best applied guards, the patients occasionally manage somehow to interfere with the dressings and injure the eye in some way, and there must be few ophthalmologists who have not eventually encountered trauma, even to the extent of the black ball eye, even in the most sophisticated clinics. So it can readily be seen how great is this problem in a busy clinic where hundreds of cataract extractions are done in a week on patients who are uneducated or illiterate country folk, and where nursing care is limited to the daily inspection and change of dressings by the doctors and the staff.

Visual Results

From the nature of the situation these are difficult to assess accurately in eye camps, since the patients are discharged home on the 7th to 10th day after operation in most instances. In some camps they are asked to return for a refraction clinic in two to three months, but this is

usually a council of perfection in view of the previously mentioned difficulties of communication and transport and the social and economic conditions, and means that a fair proportion of them are deprived of spectacles altogether.

Naturally, when patients are discharged after a week or ten days, a proportion of them have small amounts of blood or cortex in their anterior chambers, or with some degree of corneal oedema, which makes visual assessment more difficult. But still we find that if a patient has a vision of 6/60 or better on discharge, he is usually able to see 6/6 to 6/12 on examination later when he wears his spectacles. Accurate visual results can only be assessed by refracting the monocular aphakic patients when they return a year or so later to have the other eye operated on. We have often refracted a series of these, and find that the results are much the same as in other clinics, most patients getting 6/9 or better.

The other yard stick which we have to assess our visual results is the number of educated patients who come to us and are operated on by precisely the same methods as we use in our eye camps. These also have much the same results and I have repeatedly seen 6/6 vision or better on a patient treated by operation without the application of stitches and who sometimes requires no cylinder in his refraction prescription.

In those clinics where their patients return after two or three months for refraction and spectacles, a fairly accurate assessment of vision can be made, but the patients must live within a reasonable distance from the refraction clinic to enable them to come. And the majority of poor patients cannot afford a cylindrical correction in their lens. So where distances are great the only alternative is to give the patients a trial with an E chart using spherical + 9 to + 12 lenses on discharge. These temporary glasses are taken away by the patients, and either given to them or purchased for a very few rupees, and they are told to wear them after six or seven weeks.

It can easily be objected by purists that this system provides the patient with poor or mediocre vision at the best, since no cylindrical correction is supplied to him. But I have often seen patients return wearing their spectacles tilted forwards to improve their vision. This tilting, as is well known, produces a cylindrical effect, a tilt of between 15 to 25 degrees being all that is required to produce a 0.75 to 1.5 dioptres of cylindrical effect. All this may seem to border on the comic to a Westerner who has no knowledge as to how the third world lives, but for the average impecunious Asian villager, it is a matter of no little importance.

I had one educated patient, the chief clerk of a city municipality, who had had one eye operated on unsuccessfully for cataract elsewhere. After a routine cataract extraction, where no stitches were used, he was discharged, as usual, on the 10th day with a + 10 spherical lens, and told to use it after six weeks, and then to report after three months for refraction for a permanent lens. When he did return, we discovered that he had tilted his lens forward at an angle so that he had 6/6 vision with his spherical lens and could read N/5 print quite easily with his spherical reading lens, which he was reluctant to part with! So I am by no means convinced that patients discharged with spherical lenses have as poor vision as is sometimes imagined by theorists who have not had actual dealings with these patients. And perhaps the practice of giving the patient a temporary spherical lens on discharge (which he may even use permanently) has much to commend it, and those who scoff in a knowing way at this practice may be a little blind to the facts themselves.

Chapter 10

Other Operations which should be performed in Eye Camps

If the prevention and cure of blindness in rural areas is the prime object of eye camps, then it obviously follows that there are diseases other than cataract which are amenable to operation, which can and should be carried out by the ophthalmic surgeon during the course of eye camps. The prevention or cure of these diseases may alter the whole pattern of life of the patients who come, and these simple operations are infinitely valuable and worthwhile for them.

1. Glaucoma

a) Narrow Angle Glaucoma

This is usually diagnosed by the history and examination of the anterior chamber, and confirmed by tonometry. A simple prophylactic iridectomy will give a permanent cure in most instances, and should be done on both eyes. For the few patients who actually arrive in the course of an acute attack, 3fl oz of pure glycerine taken on an empty stomach with a very little orange juice almost always reduces the tension in 2 to 3 hours sufficiently for the operation to take place without mishap. This should be reinforced by diamox and pilocarpine, but it is essential to get the patient and his relatives to agree to operation before the treatment begins. It is far easier to secure this agreement when the patient is in pain on arrival, and to explain to him and to the relatives that the disease is not cured when the pain disappears. Otherwise, some patients discharge themselves when they find that their symptoms are relieved with medical treatment, in spite of all the protestations and advice of the staff.

b) Wide Angle Glaucoma

This is almost universally assumed to be a disease which is responsive in most instances to medical treatment without surgical interference. The various sophisticated drops now available and the numerous glaucoma follow-up clinics represent for the most part a triumph of medical judgment and care on the part of the ophthalmic physician. Few people in the developed countries of the world would advocate surgery for wide angle glaucoma unless the medical treatment had failed. But in this event the gradually diminishing field of vision is by no means always halted by operation. The stable door has often been closed too late.

It is true that most deep angle glaucomas respond satisfactorily to ordinary medical therapy and the disease process appears to be stabilised with the fields remaining fairly constant. But one must always bear in mind that the plight of a patient treated with miotics is often not appreciated nearly enough by the physician who examines him or her at three monthly intervals. The disabilities of vision associated with a contracted pupil are well known, but perhaps the psychological effects are not appreciated by many, and the patient lives a partially withdrawn and isolated life. And if a lens opacity supervenes, the physical and mental difficulties of the patient are increased enormously. There was a short article written in the British Journal of Ophthalmology by a medical sufferer from glaucoma which illustrates the point admirably. The doctor patient was fortunate enough to have a drainage operation carried out before it was too late and found that not only was the glaucoma arrested, but that his psychological outlook was restored to normal.

But in developing countries and especially in rural areas with a population of predominantly poor people the question of medical treatment hardly arises. In the first place, the patients cannot afford the constant expense of the miotic drops prescribed, and secondly, even if they can affird it, they are often apt to instil the drops haphazardly, missing them out for several days at a time. And thirdly, they are reluctant to accept the fact that the drops must be applied constantly to have the required effect. In the view of many, if a medicament cannot cure the malady soon, then it is unlikely to be of any use and is therefore not to be trusted. If it is expensive into the bargain, then obviously it must be viewed with greater suspicion!

So the choice is limited to what surgery can do. In our rural clinics in Pakistan we operate on all glaucomatous eyes which have some useful vision remaining. If one eye is virtually or completely blind with glaucoma, we operate on the other eye, even though the tension and vision may not be impaired, since we believe, from the experience of many thousands of examples, that glaucoma is a bilateral disease, and that if we leave the seeing or better eye unoperated, the patient will return in a year or more having reached the stage of a double absolute glaucoma. It may not be possible for the patient to return for subsequent visits at regular intervals; the most he can do is to return in a year or two or three, by which time it may be too late.

Our practice is to do a filtration operation on nearly all glaucomatous eyes, whether deep or shallow angle. Patients in the latter category come to us only when they have had three or four episodes of acute or subacute glaucoma, and mostly have little angle left for Schlemm's canal to function. We do either an iris inclusion type of operation, or else a modified Scheie's procedure. We usually carry out the iridenclysis under a conjunctival bridge flap which we raise from below with a 90 degree von Graefe incision. We have had many thousands of patients returning for many years to our clinics with one eye an absolute glaucoma and the operated one functioning satisfactorily and demonstrating the effectiveness of the simple drainage procedure.

Certainly surgery, even when undertaken early, has some failures, including operative risks. It is impossible in eye camps to conduct proper follow-up investigations, but it is a rarity to have a patient returning after an iris inclusion with a raised tension. I recall a Hindu clerk who returned fifteen years after his iris inclusion for a refraction test. He brought with him his original case slip on which was recorded that at the time of operation his tension in the better eye was 40mm Schiotz, while the other eye was a typical example of absolute glaucoma. So that we can say that many thousands of patients are going about their occupations with useful functioning eyes who would otherwise have become blind. In our out patient clinics at eye camps we find about 2-4% of all comers are incurably blind with absolute glaucoma. At first we had considerable difficulty in persuading patients to have the filtration operation on the eye which appeared to them normal and functioning. But the experience of so many of their friends and relatives in the villages has been that one eye has been saved by operation, and this fact has become widely known, so that we have much less difficulty now in gaining consent for operation.

We also see in our eye camp clinics a large number of instances where other ophthalmologists have done a broad iridectomy for glaucoma, which has proved useless. If they come with some useful sight in one eye, we do a punch sclerotomy in the 4, 5, or 6 o'clock positions in order to achieve a good flap for filtration.

It would be of extreme interest to find out at a Western glaucoma clinic what were the histories and clinical course of patients who had early filtration operations for glaucoma, compared with a similar series treated with miotics. But for developing countries for the most part there is little choice in treatment, and an operation for glaucoma in rural eye camps is just as imperative and important as an operation for cataract.

2. Entropion.

a) **Upper Lid**

This annoying complication of trachoma is very common in endemic areas and efforts should be made to correct this deformity in every eye camp. Yet in many camps I did not observe a single such operation.

The most effective method is some modification of Snellen's method. The operation is done under local infiltration of the lids and surface anaesthesia of the conjunctiva.

The first manoeuvre is to evert the upper lid with a Desmarres retractor while fixing the edge of the lid with a pair of toothed forceps. Then an incision is made along the grey line about 2mm deep from one end of the lid to the other. This provides a hinge round which the lashes can turn at the end of the operation. Then the lid is turned back to its normal position, a spatula is inserted under it from below, and the assistant holds the lid away from the globe by pressing on the lower end of the spatula, using the lower edge of the orbit as a fulcrum. An incision is made through the skin and muscle close to the lid margin, and extending to the whole length of the lid. The skin and muscle are dissected off the tarsal plate. Capillary oozing is controlled by moderate pressure on the tarsal plate by the assistant, by the adrenaline in the anaesthetic solution, and the medial or lateral tarsal vessels are clamped and twisted off, if need be. Then an incision is made under the original skin incision and another parallel with it, and a wedge shaped piece of tarsal plate is removed along the whole length of the cut. It does not matter if the incision goes through the tarsus, but it is not necessary. Stitches are then inserted so that the marginal strip of tissue, consisting of the inturned lashes and a piece of tarsal plate are turned up away from the cornea. The stitches are inserted separately on a curved cutting needle, using fine silk or cotton thread. The needle passes at right angles to the lid margin through the strip of skin on the edge of the lid, then a mattress suture is made through the tarsus, the needle passing through the wedge and coming out on the upper surface of the tarsus. Then the needle is reversed and passes in the same manner, but in the other direction, coming out on to the surface of the skin strip about 5mm to one side of the place where it was inserted. Three such stitches are made and the ends left long. If the sutures are correctly applied, the lashes should point directly forwards and even upwards with hardly any tension at all on the sutures, which are not even knotted, and are strapped to the forehead. No attempt is needed to stitch the skin, since it always heals without a scar. This is an easy and effective operation, which relieves much suffering and inconvenience.

b) Lower Lid

A simple procedure for lower entropion involves cutting a lozenge shaped area of skin and muscle from the lower lid with a curved pair of scissors under local anaesthesia, and stitching the two skin edges together. The main fact to remember is to make the upper edge of the cut very close to the lid margin.

3. Dacryo-Cysto-Rhinostomy (Summerskill's Operation)

While the very radical standard D.C.R. operations are not suited to camp conditions, the Summerskill's method comes into its own. It is simple to do, quick to perform and has a high success rate with only a small number of complications.

A modified procedure is carried out whereby the sac is incised anteriorly under local anaesthesia (nasal packing with 5 mils of amethocaine and adrenaline, and local infiltration into the skin and round the sac). The nasolacrimal nerve can be blocked if desired. The sac is opened from the front and a trocar is inserted at an angle of 45 degrees down and inwards into the middle nasal meatus. A Summerskill's flanged tube of polythene 5mm in diameter is then pushed through the hole made by the trocar, the tube being pushed in till the flange lies snugly inside the sac. The patency of the tube can be assured by seeing air bubbles come out, or by passing a tube through the Summerskill tube into the nose. The size of the trocar and the tube must be matched so that the tube requires firm pressure to insert, since a loosely fitting tube is useless, as it slides out into the sac and bulges out under the skin. It must lie firmly in the hole made for it. All that is then required is to insert two or three sutures into the skin, since the sac closes of its own accord. Even large purulent sacs with surrounding inflammation and fistula formation respond admirably to the Summerskill procedure, and in fact, the larger the sac the easier is the operation which can often be done in one or two minutes. A cataract extraction can be carried out on the eye a week after a successful operation.

The small number of recurrences which do occur after this operation are usually due to a loose fitting tube which has slipped into the sac and can be felt subcutaneously. All that is needed is to make a new incision a few weeks later and to insert a fresh tube to fit snugly into a slightly smaller hole. If the hole into the nasal cavity is made too large, then the tube will slip inside and either come out on the nasal pack or be blown out by the patient directly after operation, while lying on his face. We have never seen a single instance of inhalation over many hundreds of operations.

4. Optical Iridectomy

For many patients coming with central leucomata in one or both eyes, the question of sending them to hospital for a keratoplasty does not arise, since they cannot afford the time or the cost of the journey etc., and often the eyes are amblyopic to some extent. But a well placed optical iridectomy does give some degree of helpful vision which is useful on the road or to transform his life if the patient is otherwise completely blind. Sometimes some months elapse before the patient's amblyopic eye becomes receptive to light stimulation and he is often well able to take up a job and earn his living.

5. Pterygium

This is a very common condition in the Indian subcontinent, and is often neglected until it grows large enough to cover the cornea completely. It is a comparatively easy procedure to dissect a pterygium off the cornea by using a piece of safety razor blade in a holder and splitting the cornea superficially while dissecting off the offending tissue, and continue the splitting into the superficial sclera. The raw area in the sclera can be covered with conjunctiva by those who favour this procedure, or left to granulate. We prefer the latter method, which seems to give less likelihood of recurrences and is therefore preferable to other methods.

6. Chalazion

These can so easily be dealt with at eye camps by incision and scraping in the normal manner.

7. Vernal Catarrh

It is common to find patients presenting themselves for treatment when the spring catarrh has reached a very advanced stage with dense plaques, reminiscent of garden paving stones, on the inner aspect of their lids. Most patients have tried steroids at one time or the other, but it is difficult to see how the application of steroids, except possibly for years on end, could affect these almost cartilaginous plaques.

As a last resort we have treated these patients by cauterising the plaques and the whole

mucosa of the upper lids with diathermy. This must be done thoroughly to destroy the plaques and done under general anaesthesia. The after treatment is to apply a steroid to reduce post-operative reaction and an antibiotic as well, cold or hot compresses to diminish the swelling, and keep the patient in hospital for four or five days. The slough separates, leaving a clean lid, and the whole post-operative course is relatively painless. The symptoms are greatly reduced by one treatment, and another a few weeks later can be done, which seems to clear up all with the smallest inconvenience. We have tried this treatment on educated lawyers and on illiterate villagers with much the same results. It appears to be a crude and primitive procedure, and theoretically one can produce many objections to it, but in practice it has resulted in great relief to many patients, many of whom come for a final cautery, having derived so much benefit from the first. But it must be remembered that a thorough cautery is needed, since a superficial touch with the cautery is useless.

8. Staphyloma

Never seen in the West, but a real stigma and source of trouble to many who come to eye camps. Sometimes these are so large that flies can even be seen sett ing on to them, and the lids can nowhere nearly be closed.

Obviously, enucleation or evisceration is the cure, if the patient will allow this, but in some areas there is religious prejudice against removing an organ, and in these instances a very satisfactory result can be obtained by excising the staphyloma, holding up the elliptical wound edges with forceps or hooks, stitching them together with continuous catgut suture, and covering the wound with a layer of conjunctiva, to avoid the possible danger of sympathetic ophthalmia, which we have not encountered after this operation.

9. Evisceration and Enucleation

These can be easily carried out in an eye camp wherever indicated; in adults under local anaesthesia, if no sepsis is present, and otherwise and in children, under general anaesthesia.

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